

# **Final Report**

Program of Research and Education in Aerospace Structures

NASA GRANT NCC1-03008

For the Period

January 1, 2003 through June 30, 2005

NASA Tech Officer

Laurie W. Johansen

GW Principal Investigator

John L. Whitesides

Since its inception in January 2003, the program has provided support for 1 research professor and a total of 10 Graduate Research Scholar Assistants, of these all 10 have completed their MS degree program. The program has generated 10 MS thesis. This Grant has been

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Participants during this period included:

### Activities:

A List of seminars presented is given in Appendix A.  
A list of publications and presentations is given in Appendix B.  
The Graduate Research Scholar Assistants supported in whole or in part under this award and their initial employer upon graduation from GW are listed in Appendix C.

## APPENDIX A

### SEMINARS PRESENTED

1. "Photogrammetry and Videogrammetry Methods Development for Solar Sail Structures," J. T. Black, Summer 2003.
2. "Crash Test and Analysis Validation of Aircraft Seat Structures," R. M. Lunceford, Fall 2003.
3. "Hydrodynamic Foam Material Characterization for Use in Transient Finite Element Model," A. W. Nelson, Summer 2004.
4. "Thermal Analysis and Parameter Characterization of the Electron Beam Freeform Fabrication Process for Titanium Deposits," E. W. Osborne, Summer 2004
5. "Steady-State Dynamic Characterization of Subscale Solar Sails," C. L. Puschmann, Summer 2004.
6. "Nonlinear, Transient Conduction Heat Transfer Using a Discontinuous Galerkin Hierarchical Finite Element Method," J. C. Sanders, Summer 2004.
7. "Characterization and Evaluation of a Mass Efficient Heat Storage Device," S. C. Splinter, Summer 2004.
8. "Photogrammetry Simulations Using CAD-Generated Models and Comparison with Experiments," E. N. Walker, Summer 2004
9. "Validation of Design and Analysis Techniques of Tailored Composite Structures," D. D. Wijayratne, Summer 2004.
10. "Further Development of the Heat Sponge Concept Using Water-Ammonia Mixtures," A. R. Gifford, Fall 2004.

## APPENDIX B

### PUBLICATIONS AND PRESENTATIONS

1. R. S. Pappa, J. T. Black, J. R. Blandino, T. W. Jones, P. M. Danchy, and A. A. Dorrington, "Dot-Projection Photogrammetry and Videogrammetry of Gossamer Space Structure." Presented: 21<sup>st</sup> International Modal Analysis Conference, Kissimmee, FL, February 3-7, 2003. Published: NASA/TM-2003-212146, January 2003.
2. J. T. Black and R. S. Pappa, "Videogrammetry Using Projected Circular Target: Proof-of-Concept Test." Presented: 21<sup>st</sup> International Modal Analysis Conference, Kissimmee, FL, February 3-7, 2003. Published: NASA/TM-2003-212148, February 2003.
3. J. Leifer, J. T. Black, W. K. Belvin, and V. Behun, "Evaluation of Shear Compliant Borders for Wrinkle Reduction in Thin Film Membrane Structures." Presented: 44<sup>th</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, April 7-10, 2003, Norfolk, VA. Published: AIAA 2003-1984.
4. J. R. Blandino, R. S. Pappa, and J. T. Black, "Modal Identification of Membrane Structures with Videogrammetry and Laser Vibrometry." Presented: 44<sup>th</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, April 7-10, 2003, Norfolk, VA.
5. J. Johnston, J. Blandino, J. Black, and R. Pappa, "Structural Analysis and Testing of a Subscale Sunshield Membrane Layer." Presented: 44<sup>th</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, April 7-10, 2003, Norfolk, VA.
6. J. Black, "Photogrammetry and Videogrammetry Methods for Solar Sails and Other Gossamer Structures." Presented: AIAA Mid-Atlantic Region 1 Student Conference, College Park, MD, April 11-12, 2003.
7. D. Wijayratne, "Validation of Design and Analysis Techniques for Aeroelastically Tailored Composite Structures." Presented: AIAA Mid-Atlantic Region I Student Conference, Virginia Polytechnic Institute and State University, VA, April 16-18, 2004.

APPENDIX C

GRADUATES

EMPLOYED BY

Summer 2003

Black, Jonathan T.

University of Kentucky (job/grad school)

Fall 2003

Lunceford, Robert M.

Applied Research Associates, Vicksburg, MS

Summer 2004

Nelson, Anthony W.

Lockheed Martin Space Systems, Littleton, CO

Osborne, Erik W.

Boeing Commercial Airplane Group, Everett, WA

Puschmann, Carrie L.

Unknown

Sanders, Jerome C.

University of Connecticut (DSc)

Splinter, Scott C.

Lockheed Martin Space Operations @ NASA LaRC, VA

Walker, Eric N.

Orbital Sciences Corporation, Dulles, VA

Wijayratne, Dulnath D.

Boeing Commercial Airplane Group, Everett, WA

Fall 2004

Gifford, Andrew R.

Virginia Polytechnic Institute & State University